

ACROSS AFRICA<sup>1</sup>

TO cross Africa has almost ceased to be an extraordinary feat. Indeed it seems evident, the more we know of the Portuguese native traders, that even before Livingstone's memorable first journey, it was no uncommon thing for the Pombeiros to do in the ordinary way of business. Of course some routes are more dangerous than others, and that by which Stanley made his famous march was perhaps the most difficult and dangerous that could be selected. Still the journey performed by Major Serpa Pinto was in many ways remarkable, and perhaps not its least remarkable feature is the characteristic manner in which he tells his story. The Major's narrative is in every respect a contrast to the quiet and sober narrative of Dr. Holub, recently reviewed in these pages. The Major is all excitement and enthusiasm, and his frequent digression to unbosom himself of his feelings under his frequently trying circumstances, though they do not convey much information, are pleasant reading. The expedition of which he was leader was fitted out very handsomely by the Portuguese Government, its object being to cross the continent from the Portuguese settlements in the west to those on the east coast. He was accompanied by MM. Ivens and Capello, but these soon parted from him, and conducted an exploration on their own account, the full narrative of which has yet to be published. Much time was wasted at the outset before the expedition could leave Benguela, collecting carriers and making other arrangements, so that it was January, 1878, before the Major fairly started for the interior. Although much of the ground he traversed had been gone over before, coinciding partly with the route of Livingstone, still he was able to open up a considerable stretch of new country, and most of all to clear up to a great extent the complicated hydrography of the region lying between the West Coast and the Zambesi. While the Major has many interesting notes on the natural history of the country he traversed, and while he seems to have been able to bring to light some new animals and not a few new plants, the main value of his narrative lies in the full details he gives on the geography and ethnology of Western South Africa. He was unable to carry out the original programme of the expedition, having been compelled to turn southwards on reaching the Central Zambesi, reaching the East Coast at Natal. On leaving Benguela the Major proceeded in a south-easterly direction towards the Cunene, before reaching which he turned north-eastwards, proceeding by Caconda to Bihé. After staying here for some time he again turned south-eastwards across the Cuando to the Zambesi, a little below its junction with the Liba, which seems to have more right to be considered the main stream than that which comes from the east. Proceeding down the Zambesi, passing numerous cataracts, he got into trouble among the Barotse, a new king having succeeded to the deposed Sepopo, whom Dr. Holub found ruling the Marutse-Mabunda kingdom at Sesheke. Escaping with bare life, he fell in with the French missionary family Coillard, who gave him all possible succour, visited and attempted to survey the Victoria Falls, and proceeded southwards and eastwards in a leisurely way into country pretty well known, but of which and of its various native states he is able to give us some interesting details. Between the West Coast and the Zambesi the expedition must have crossed hundreds of rivers, many of which Major Pinto has laid down with approximate accuracy in his maps. For he deserves the highest praise for the persistency with which he took his observations under the most trying circumstances, so that to the cartographer his work is of the greatest value. It is no easy matter to discriminate the

various watersheds here, and indeed the observations of Major Pinto, combined with those of previous travellers, shows that many of the rivers which flow north to the Congo, south-west to the Atlantic, south by Cubango to Lake Ngami, and south-east to the Zambesi, rise quite close together on what is really a table-land; and in the rainy season it will often be difficult for them to make up their minds which direction they shall take. Major Pinto's numerous maps tend greatly to clear up the complicated hydrography of this region.

The country through which he passed to reach the Zambesi is varied in its aspect and productiveness, though most of it is luxuriantly fertile, and capable of great development. Much of it is however swampy, and even cultivated fertile districts are depopulated, mainly through wars and slave-hunting. Major Pinto tells us much that is interesting on the metal-working, which is common along the first part of his route. There seems to be really a large store of iron in this region, and the natives show considerable ingenuity in working it. There are several chief centres for these operations, and the metal is fashioned into all sorts of implements and weapons.



FIG. 1.—Cabango Man.

"During the coldest months, that is to say June and July, the Gonzellos miners leave their homes and take up their abode in extensive encampments near the iron-mines, which are abundant in the country. In order to extract the ore they dig circular holes or shafts of about ten to thirteen feet in diameter, but not more than six or seven feet deep; this arises most probably from their want of means to raise the ore to a greater elevation. I examined several of these shafts in the neighbourhood of the Cubango, and found them all of a similar character. As soon as they have extracted sufficient ore for the work of the year they begin separating the iron. This is done in holes of no great depth, the ore being mixed with charcoal, and the temperature being raised by means of primitive bellows, consisting of two wooden cylinders about a foot in diameter, hollowed out to a depth of four inches, and covered with two tanned goat-skins, to which are fixed two handles, twenty inches long and half an inch thick. By a rapid movement of these handles a current of air is produced which plays upon the charcoal through two hollow wooden tubes attached to the

<sup>1</sup> "How I Crossed Africa, from the Atlantic to the Indian Ocean," &c. By Major Serpa Pinto. Translated from the Author's manuscript by Alfred Elwes. Two vols. Maps and Illustrations. (London: Sampson Low and Co., 1881.)

cylinders, and furnished with clay muzzles. By incessant labour, kept up night and day, the whole of the metal becomes transformed, by ordinary processes, into spades, axes, war-hatchets, arrow-heads, assegais, nails, knives, and bullets for fire-arms, and even occasionally fire-arms themselves, the iron being tempered with ox-grease and salt. I have seen a good many of these guns carry as well as the best pieces made of cast steel."

The book contains several illustrations of the methods adopted, and the double-bellows used for the furnace is very curious. His observations on the animals met with along his route are valuable, and he has carefully indicated on his map where the principal animals are found. Elephants seem to be abundant enough south-east of Bihé, and lions were met with in considerable numbers as the Zambesi was approached. He also met with the huge and dangerous buffaloes familiar to readers of Livingstone's First Journey. One of our illustrations gives a good idea of an antelope which was met with in the Cuchibi, which the Major thus describes:—

"At one of the turns of the river I perceived three antelopes of an unknown species, at least to me; but just as I was in the act of letting fly at them they leaped into the water and disappeared beneath its surface. The circumstance caused me immense surprise, which was increased as I went further on, as I occasionally came across several of these creatures, swimming, and then rapidly diving, keeping their heads under water, so that only the tips of their horns were visible. This strange animal, which I afterwards found an opportunity of shooting on the Cuchibi, and of whose habits I had by that time acquired some knowledge, is of sufficient interest to induce me for a moment to suspend my narrative to say a few words concerning it. It bears among the Bihenos the name of Quichôbo, and among the Ambuellas that of Buzi. Its size, when full grown, is that of a one-year-old steer. The colour of the hair is dark grey, from one quarter to half an inch long, and extremely smooth; the hair is shorter on the head, and a white stripe crosses the top of the nostrils. The length of the horns is about two feet, the section at the base being semicircular, with an almost rectilinear chord. This section is retained up to about three-fourths of their height, after which they become almost circular to the tips. The mean axis of the horns is straight, and they form a slight angle between them. They are twisted around the axis without losing their rectilinear shape, and terminate in a broad spiral. The feet are furnished with long hoofs similar to those of a sheep, and are curved at the points. This arrangement of its feet and its sedentary habits render this remarkable ruminant unfitted for running. Its life is therefore in a great measure passed in the water, it never straying far from the river banks, on to which it crawls for pasture, and then chiefly in the night-time. It sleeps and reposes in the water. Its diving-powers are equal, if not superior, to those of the hippopotamus. During sleep it comes near to the surface of the water, so as to show half its horns above it. It is very timid by nature, and plunges to the bottom of the river at the slightest symptom of danger. It can easily be captured and killed, so that the natives hunt it successfully, turning to account its magnificent skin and feeding off its carcase, which is however but poor meat. Upon leaving the water for pasture its little skill in running allows the natives to take it alive; and it is not dangerous, even at bay, like most of the antelope tribe. The female, as well as the male, is furnished with horns. There are many points of contact between the life of this strange ruminant and that of the hippopotamus, its near neighbour. The rivers Cubangui, Cuchibi, and the upper Cuando offer a refuge to thousands of Quichôbos, whilst they do not appear either in the lower Cuando or the Zambesi. I explain this fact by the greater ferocity of the crocodiles in the Zambesi and lower Cuando, which

would make short work of so defenceless an animal if it ventured to show itself in their waters."

Major Pinto's account of the powerful kingdom of Bihé is full of interest. It is evident from his narrative and those of Dr. Holub and Mr. Joseph Thomson that these African states are in a constant state of unstable equilibrium. Not only are the chiefs and dynasties frequently changed, but an entire population may be removed or reduced to slavery, and its dominant place taken by a conquering people. The Bihenos are probably the most extensive travellers in Africa.

"Where travelling is concerned as connected with trade, nothing comes amiss to the Bihenos, who seem ready for anything. If they only had the power of telling where they had been and describing what they had seen, the geographers of Europe would not have occasion to leave blank great part of the map of South Central Africa. The Biheno quits his home with the utmost indifference, and bearing a load of sixty-six pounds of goods, will start for the interior, where he will remain two, three, and four years; and on his return, after that lapse of time, will be received just as though he had been on a journey of as many days. Silva Porto, whilst engaged in doing business with the Zambesi, was despatching his negroes in other directions, and was trading at the same time in the Mucusso country and in the Lunda and Luapula territories. The fame of the Bihenos has travelled far and wide, and when Graça attempted his journey to the Matianvo he first proceeded to the Bihé to procure carriers. These people have a certain emulation among one another as travellers, and I met with many who prided themselves on having gone where no others had ever been, and which they called *discovering new lands*. They are brought up to wandering from their very infancy, and all caravans carry innumerable children, who, with loads proportionate to their strength, accompany their parents or relatives on the longest journeys; hence it is no uncommon thing to find a young fellow of five-and-twenty who has travelled in the Matianvo, Niangué, Luapula, Zambesi, and Mucusso districts, having commenced his perigrinations at the age of nine years."

Major Pinto has a good deal to tell us of the various kinds of ants he met with on his journey, though the value of his observations is much decreased from his want of a knowledge of entomology. Here is his account of one terrible insect:—

"When the work of cutting down the wood for our encampment commenced I saw a sudden commotion among my blacks, who then took to their heels in every direction. Not understanding the cause of their panic, I immediately proceeded to the spot to make inquiries. On the very place which I had selected for my camp appeared issuing from the earth millions of that terrible ant called by the Bihenos *quissonde*, and it was the sight of these formidable creatures which scattered my men. The *quissonde* ant is one of the most redoubtable *wild beasts* of the African continent. The natives say it will even attack and kill an elephant, by swarming into his trunk and ears. It is an enemy which, from its countless numbers, it is quite vain to attack, and the only safety is to be found in flight. The length of the *quissonde* is about the eighth of an inch; its colour is a light chestnut, which glistens in the sun. The mandibles of this fierce hymenopter are of great strength, and utterly disproportioned to the size of the trunk. It bites severely, and little streams of blood issue from the wounds it makes. The chiefs of these terrible warriors lead their compact phalanxes to great distances and attack any animal they find upon the way. On more than one occasion during my journey I had to flee from the presence of these dreadful insects. Occasionally upon my road I have seen hundreds of them, apparently crushed beneath the foot, get up and continue their march, at first somewhat slowly,



but after a time with their customary speed, so great is their vitality."

The author gives some valuable details concerning the

Mucassequeres, who seem to be a remnant of one of the primitive African tribes.

"The Mucassequeres occupy, jointly with the Am-



FIG. 2.—The Quichôbo.

buellas, the territory lying between the Cubango and Cuando, the latter dwelling on the rivers and the former in the forests; in describing the two tribes, one may say that the latter are barbarians and the former downright savages. They hold but little communication with each other, but, on the other hand, they do not break out into hostilities. When pressed by hunger the Mucassequeres will come over to the Ambuellas and procure food by the barter of ivory and wax. Each tribe would seem to be independent, and not recognise any common chief. If they do not fight with their neighbours they nevertheless quarrel among themselves; and the prisoners taken in these conflicts are sold as slaves to the Ambuellas, who subsequently dispose of them to the Bihé caravans. The Mucassequeres may be styled the true savages of South Tropical Africa. They construct no dwelling-houses or anything in the likeness of them. They are born under the shadow of a forest-tree, and so they are content to die. They despise alike the rains which deluge the earth and the sun which burns it; and bear the rigours of the seasons with the same stoicism as the wild beasts. In some respects they would seem to be even below the wild denizens of the jungle, for the lion and tiger have at least a cave or den in which they seek shelter, whilst the Mucassequeres have neither. As they never cultivate the ground, implements of agriculture are entirely unknown among them; roots, honey, and the animals caught in the chase constitute their food, and each tribe devotes its entire time to hunting for roots, honey and game. They rarely sleep to-day where they lay down yesterday. The arrow is their only weapon; but so dexterous are they in its use, that an animal sighted is as good as bagged. Even the elephant not unfrequently

falls a prey to these dexterous hunters, whose arrows find



FIG. 3.—Mucassequera.

every vulnerable point in his otherwise impervious hide. The two races which inhabit this country are as different

in personal appearance as they are in habits. The Ambuella, for instance, is a black of the type of the Caucasian race; the Mucassequere is a white of the type of the Hottentot race in all its hideousness. Many of our sailors, browned by the sun and beaten by the winds of many a storm, are darker than the Mucassequeres, whose complexion besides has so much of dirty yellow in it as to make the ugliness more repulsive. I regret exceedingly my inability to obtain more precise data concerning this curious race, which I consider to be worthy the special attention of anthropologists and ethnographers. In my opinion this branch of the Ethiopic race may be classified in the group of the Hottentot division. In form it possesses many of the characteristics of the latter, and we may observe in this peculiar race a sensible variation in the colour of the skin. The *Bushmen* to the south of the Calaári are very fair of hue, and I have noticed some who were almost white. They are low of stature and thin of body, but exhibit all the characteristics of the Hottentot type. To the north of that same desert tract, more especially about the salt-lakes, there is another nomad race, that of the Massaruas, strongly built, of lofty stature, and of a deep black, who possess the same Hottentot type, and who indubitably belong to the same group. I was told on the Cuchibi that between the Cubango and the Cuando, but a good deal to the south, there existed another race, in every respect similar to the Mucassequeres, both in type and habits, but of a deep black colour. In consideration therefore of the affinity of character, I have no hesitation in admitting that the Hottentot group of the Ethiopic race extends to the north of the Cape as far as the country lying between the Cubango and the Cuando, passing through sundry modifications of colour and stature, due probably to the conditions under which they live, to altitude, to the great difference of latitude, or even to other causes that are less apparent."

By the time Major Pinto reached the Barotse territory and fell in with the hospitable missionary family Coillard, he had got on to comparatively well-known ground, though the interest of his story is sustained to the very end; and even here he succeeds in adding something to our knowledge of the countries through which he passed. His visit to the Great Falls of the Zambesi, and his illustrations taken from various points, are a material addition to what we know of them from the narratives of Livingstone and Mohr. Some of his observations are worth quoting, especially as, under circumstances of the greatest danger, he succeeded in making a fairly accurate survey. "*Mozi-oa-tunia*" is a Basuto word, meaning "the smoke is rising," "so that it is very easy to suppose how a name, common among the natives and apparently so apt and appropriate, came to be given by strangers to the cataract itself."

"*Mozi-oa-tunia* is neither more nor less than a long trough, a gigantic crevasse, the sort of chasm for which was invented the word abyss—an abyss profound and monstrous into which the Zambesi precipitates itself bodily to an extent of 1978 yards. The cleft in the basaltic rocks which form the northern wall of the abyss is perfectly traceable, running east and west. Parallel thereto, another enormous wall of basalt, standing upon the same level, and 110 yards distant from it, forms the opposite side of the crevasse. The feet of these huge moles of black basalt form a channel through which the river rushes after its fall, a channel which is certainly much narrower than the upper aperture, but whose width it is impossible to measure. In the southern wall, and about three-fifth parts along it, the rock has been riven asunder, and forms another gigantic chasm, perpendicular to the first; which chasm, first taking a westerly curve and subsequently bending southwards and then eastwards, receives the river and conveys it in a capricious zigzag through a perfect maze of rocks. The great

northern wall of the cataract over which the water flows is in places perfectly vertical, with few or none of those breaks or irregularities that one is accustomed to see under such circumstances. An enormous volcanic convulsion must have rent the rock asunder and produced the huge abyss into which one of the largest rivers in the world precipitates itself. Undoubtedly the powerful wearing of the waters has greatly modified the surface of the rocks, but it is not difficult for an observant eye to discover clearly that those deep scarps, now separated from each other, must at one time have been firmly united. The Zambesi, encountering upon its way the crevasse to which we have alluded, rushes into it in three grand cataracts, because a couple of islands which occupy two great spaces in the northern wall divide the stream into three separate branches. The first cataract is formed by a branch which passes to the south of the first island, an island which occupies, in the right angle assumed by the upper part of the cleft, the extreme west. This branch or arm consequently precipitates itself in the confined space open on the western side of the rectangle. It is 196 feet wide and has a perpendicular fall of 262 feet, tumbling into a basin whence the water overflows to the bottom of the abyss, there to unite itself to the rest in rapids and cascades that are almost invisible, owing to the thick cloud of vapour which envelopes the entire foot of the Falls. The island which separates that branch of the river is covered with the richest vegetation, the leafy shrubs extending to the very edge along which the water rushes, and presenting a most marvellous prospect. This is the smallest of the Falls, but it is the most beautiful, or, more correctly speaking, the only one that is really beautiful, for all else at Mozi-oa-tunia is sublimely horrible. That enormous gulf, black as is the basalt which forms it, dark and dense as is the cloud which enwraps it, would have been chosen, if known in biblical times, as an image of the infernal regions, a hell of water and darkness, more terrible perhaps than the hell of fire and light. Continuing our examination of the cataract, we find that the beginning of the northern wall, which starts from the western cascade, is occupied to an extent of some 218 yards by the island I have before alluded to, and which confines that branch of the river that constitutes the first Fall. It is the only point whence the entire wall is visible, simply because along that space of 218 yards the vapour does not completely conceal the depths. It was at that point I took my first measurements, and by means of two triangles I found the upper width of the rift to be 328 feet, and the perpendicular height of the wall 393 feet. This vertical height is even greater further to the eastward, because the trough goes on deepening to the channel through which the river escapes to the south. At that point likewise I obtained data for measuring the height. In my first measurements I had as my base the side of 328 feet, found to be the upper width of the rift; but it was necessary to see the foot of the wall, and I had to risk my life to do so. After the first island, where I made my measurements, comes the chief part of the cataract, being the portion comprised between the above island and Garden Island. In that spot the main body of the water rushes into the abyss in a compact mass, 1312 feet in length, and there, as is natural, we find the greatest depth. Then follows Garden Island, with a frontage of 132 feet to the rift, and afterwards the third Fall, composed of dozens of falls which occupy the entire space between Garden Island and the eastern extremity of the wall. This third Fall must be the most important in the rainy season, when the masses of rock which at other times divide the stream are concealed, and but one unbroken and enormous cataract meets the eye. As the water which runs from the two first falls and from part of the third near Garden Island rushes eastward, it meets the remainder of the third Fall coursing west, and the result



is a frightful seething whirlpool, whence the creamy waters rush, after the mad conflict, into the narrow rocky

channel before alluded to, and go hissing away through the capricious zigzag chasm."

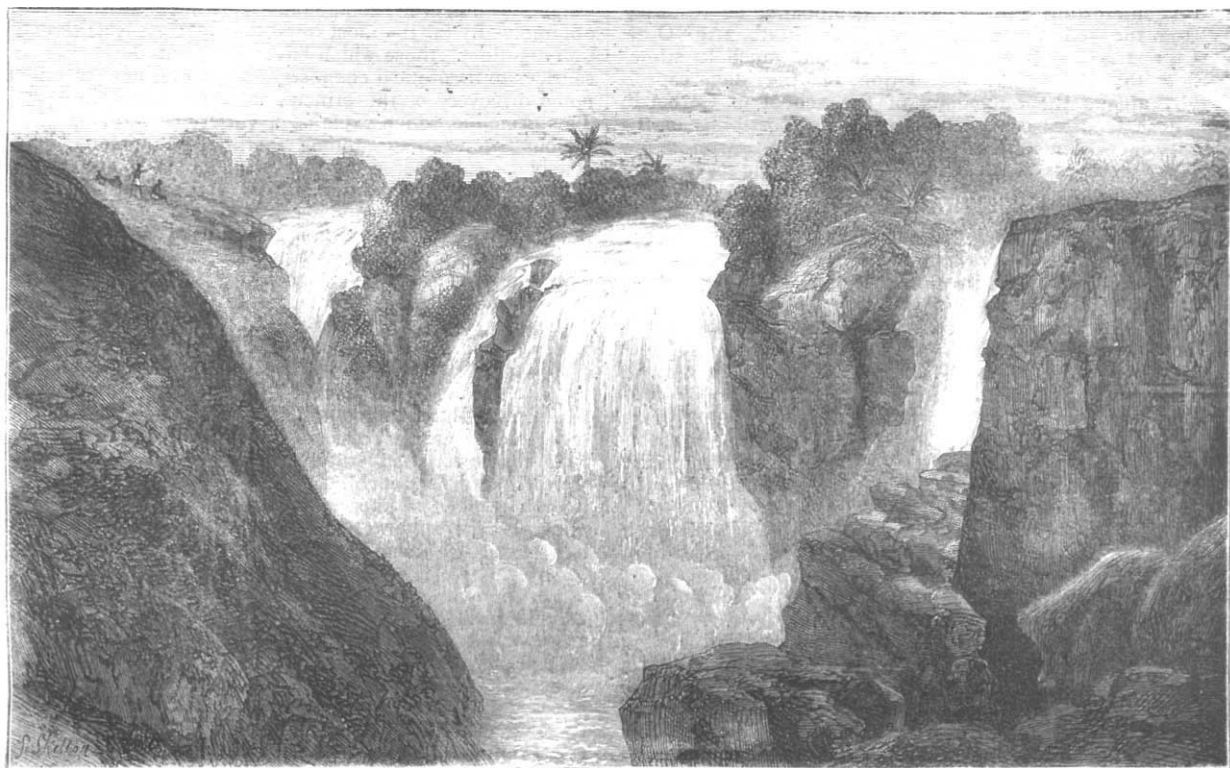


FIG. 4.—Mozi-Oa-Tunia (the Victoria Falls).—The West Falls.

In the appendices and throughout the work Major Pinto gives many astronomical and meteorological observations which are of real scientific value. Altogether his work is

one of the most attractive and instructive of recent narratives of African travel.

#### ETIENNE HENRY SAINTE-CLAIRE DEVILLE.

WE regret to record a serious loss to French chemistry in the death of the celebrated professor, Sainte-Claire Deville, which occurred July 1, at Boulogne-sur-Seine. Étienne Henry Sainte-Claire Deville was born March 11, 1818, on the island of St. Thomas, in the Antilles, and was of Creole origin. Like most of the youth in the French colonies, he was sent to Paris to undertake a course of study. Of his two brothers who also proceeded to France to enter upon active careers, one, the late Charles Sainte-Claire Deville, devoted himself likewise to science, and we have had occasion more than once to refer to his remarkable geological investigations in these pages. While the Creole element has rarely lacked in the artistic and literary circles of the French capital, we believe that the two brothers in question furnish the only notable instance in which science has profited from the highly imaginative and versatile Creole temperament. It is related of the young Henry that on completing his collegiate studies, he hesitated for a long time in making his choice between music and science. His decision was due in a great measure to the enthusiasm awakened at the time by the brilliant lectures and no less brilliant investigations of Jean Baptiste Dumas. Guided by the counsels of the latter, he equipped a laboratory, and commenced a series of investigations so fertile of results that in a short time he was ranked among the most promising of the younger school of

chemists. In 1844 he entered upon professorial duties in accepting the Chair of Chemistry in the Scientific Faculty of Besançon, where, notwithstanding his comparative youth, he was appointed dean of his faculty. In 1851 he was called upon to succeed Balard as Professor of Chemistry at the *École Normale* of Paris. Gladly exchanging the comparative obscurity of a provincial university town for the manifold advantages of a Parisian professorship, he devoted himself with such ardour to the duties of his new position that, after a short lapse of time, the laboratory of the *École Normale* became one of the central points of chemical investigation, not only in France but in all Europe. In 1854 he accepted, in addition to his usual duties, a lectureship at the Sorbonne, which, fourteen years later, was changed for a full professorship. His favourite field of activity remained, however, the *École Normale*, and it was with difficulty, some months since, that he felt himself called upon to relinquish active professorial duties in consequence of rapidly increasing feebleness.

As an investigator, Deville made his *début* in organic chemistry in 1840 with a remarkable study of turpentine oil and various derivatives of the terpenes. His carefully tabulated results form the chief basis of our present knowledge of the different isomeric states of this group. They were followed in 1842 by a research on toluene, the importance of which was only duly felt on the introduction of the aniline colours. After minor investigations of various resins, Deville abandoned organic chemistry